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ABSTRACT

This paper investigates the ways readers use two semantic tools, synonymy and entailment, when responding to reading-comprehension questions. After a brief overview of semantic theory, two reading passages and their attendant multiple-choice questions are analyzed, demonstrating how readers might choose the correct answer by analyzing the way it paraphrases or entails material presented in the passages. The paper concludes that these semantic tools are useful to teachers, either in reading or in the content areas, who develop and test comprehension. (RL)

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ASPECTS OF SEMANTIC THEORY AND READING COMPREHENSION

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ASPECTS OF SEMANTIC THEORY AND READING COMPREHENSION

The discipline of linguistics has much to contribute to reading theory and instruction. Much of the literature today on reading activity details a number of topics which directly or indirectly have some bearing on the nature of linguistic theory and its application to such reading topics as content, diagnosis, testing, evaluation, and so on. In much the same manner, the discipline of psycholinguistics as advanced by such analysts as Goodman (1969), Smith (1971), Cooper and Petrosky (1976) have increased our knowledge of reading and the reading process.

In this paper, I investigate two aspects of semantics - a sub-component of general linguistic theory- in order to determine how this kind of information might help the teacher in terms of developing and testing comprehension skills. The two aspects which I would like to discuss are: (a) synonymy (sometimes called paraphrase), and (b) entailment. By synonymy (synonymous), we mean that words and/or sentences have the same or nearly the same meaning (e.g., eye-doctor, optometrist, or oculist and He ate the pizza is synonymous to The pizza was eaten by him). By entailment, we mean that some phenomenon is implied or follows based on what is stated before (e.g., Rulers are divine entails Kings, Czars, Presidents, are divine). Much of this discussion follows that of Leech (1966) and Katz (1972).

There are several factors which have motivated this discussion. First, like other analysts (Clark 1969a, Goodman 1969, and Wardhaugh 1972), this author contends that reading is a language-based activity, and this activity must incorporate general principles of cognition (thought) and language structure. Second, reading comprehension should not be confined to merely arriving at the "right" answer. Where possible, a teacher should strive to consciously elicit the cognitive processes behind a student's answer which is deemed correct. Third, an approach which involves the cooperative working of language and mind is one that is generally built into a reading curriculum under such topics as

critical and/or inferential reading, solving analogies, determining the main idea and so on. Fourth, since the acquisition of meaning, as it has been frequently stated, is the primary purpose of reading, then we believe that this discussion has some bearing on the procedure for deriving meaning from the printed page.

The author realizes that a discussion of this type presupposes some formal instruction in linguistics on the reader's part, or at any rate, some familiarity with the terminologies being used. Some classroom teachers might be using similar kinds of teaching strategies without any formal acquaintance with aspects of semantic theory.
We are limiting this topic to the mature reader (i.e., those students who have no real need for corrective instruction).

Brief Overview of Semantic Theory

Before beginning this discussion, it may be fitting to sketch in briefly some of the theoretical framework governing semantic inquiry. This can only be a brief account for discussions on semantics usually occup large volumes of investigation. Since this topic pertains to reading activity, we will limit our discussion to topics pertaining thereto. Again, this can only be a minimal account (undertaking).

In trying to explain how a speaker- in this case a reader- understands (comprehends) sentences[1], the linguist/semanticist postulates certain principles which govern word and sentence structure. By postulating such principles, the semanticist is better able to account for acceptable, well-formed, nonsensical, and contradictory sentences.

One principle that is generally put forward is called "selectional restriction." According to the semanticist, the principle of selectional restriction imposes certain constraints on lexical (vocabulary) and sentential structures. Lexical items are further divided into specific features. If such features are violated, we arrive at anomalous, ambiguous, contradictory sentences. Let us look at an example of selectional restriction for purposes of illustration.

1 Moderrn studies in linguistics (Chomsky 1965) contend that the sentence is the most significant unit for language study. We are following this approach.

If a teacher were to write or utter the sentence: I ate a rock, his/her students might simply dismiss such a sentence as being comical or nonsensical. They should be informed since this sentence is violating the principle of selectional restriction. The explantion advanced by the semanticist is that a word like eat must have as certain features[2], those marked [+edible], [+animate subject], the word rock has, among its features, those marked [+inedible], [+concrete] [+inanimate subject] among others. The reason why the sentence: I ate a rock is therefore considered humorous, or anomalous is because the words rock and ate have features which are incompatible with each other.

The theoretical framework of feature analysis can be shown in this observation by Katz (1972:34) who states:

> Since the semantic and relations of an expression are determined by its meaning and since its meaning is given by semantic representations, it follows that the definitions of semantic properties and relations must be stated in terms of formal features of semantic representations. If this done, there will be an explanation of how the meaning of one expression makes it synonymous with another, or analytic, semantically ambiguous, semantically anomalous, and so on.

The notion of features stated above, therefore, becomes one analytic tool by which the semanticist can better explain the relationship of words in sentences.

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2 By features we mean certain inherent abstract properties of words which serve to maintain certain logical syntactic relationships in sentences.

Another postulate which has been advocated by semanticists in determining how we arrive at meaning (comprehension) consists in establishing certain types of relationships in sentences. Much of the theory governing this approach stems from symbolic logic, philosophy, and information theory. By drawing from a wide source of disciplines which have some direct bearing on thought processes, the semanticist is better able to establish an argument for the way we interpret and understand utterances or the printed word. Some of these relationships are antonymy (e.g., man vs woman), superordination (e.g., Emperors are females or He is a girl), presupposition (e.g., Where is my hat presupposes the truth of the declarative: The hat is someplace). It is from this theoretical base that we have decided to use the principles of synonymy and entailment.

Data

While perusing some duplicated material, this investigator found two articles appropriate enough to demonstrate the skill of paragraph analysis. Of course, similar kinds of continuous prose material might just as well have been chosen to demonstrate this skill. While the students were verbalizing their answers, I found that some were merely guessing, or deducing the answers based on the alphabetic response which other students gave. Thus, if the answer were (C), and the students gave (A), (B), (D), and (E) from five possible choices, then it could be said that some correct answers were simply arrived at by guessing. This is sometimes the case in multiple-choice type questions.

While we were in the process of analyzing the answers, it appeared that perhaps there were semantic principles which were governing the student's responses to the comprehension questions. Also, in trying to establish why one answer was "stronger"[3] than the other, I realized that the students must have

3 I am using the concept of "semantic strength" to facilitate possible competing answers given to questions. In other words, where two answers seem appropriate, decisions on the right answer are based on the relative strength of an answer using the skills of logical inquiry.

been processing the information within the parameters of synonymy and entailment (among others).

We will present the passages used in this discussion, and then attempt to show how the concepts of synonymy and entailment are used in order to arrive at comprehension. There was no citation for the source of the material.

P_1 Disregard for odds and complete confidence in one's self have produced many of our great successes. But every young man who wants to go into business for himself should appraise himself as a candidate for the one percent to survive. What has he to offer that is new or better? Has he special talents, special know-how, a new invention or service, or more capital than the average competitor? Has he the most important qualification of all, a willingness to work harder than anyone else? A man who is working for himself without limitation of hours or personal sacrifice can run circles around any operation that relies on paid help. But he must forget the eight-hour day, the forty-hour week, and the annual vacation. When he stops work, his income stops unless he hires a substitute. Most small operations have their busiest day on Saturday, and the owner uses Sunday to catch up on his correspondence, bookkeeping, inventorying, and maintenance chores. The successful self-employed man invariably works harder and worries more than the man on a salary. His wife and children make corresponding sacrifices of family unity and continuity; they never know whether their man will be home or in a mood to enjoy family activities.

1. The title below that best expresses the ideas of this passage is:
   A. Overcoming obstacles
   B. Running one's own business
   C. How to become a success
   D. Young men in industry
   E. Why small businesses fail

P_2 While the poll takers are most widely known for their political surveys, the greatest part of their work is on behalf of American business. There are three kinds of commercial surveys. One is public relations research, such as that done for banks which finds out how the public feels about a company. Another is employee-attitude research, which can avert strikes by getting to the bottom of grievances quickly. The third, and probably most spectacular, is marketing research, testing public receptivity to products and designs. The investment a company must make for a new product is enormous--$5,000,000 or $10,000,000, for instance, for just one new product. Through the surveys a company can discover in advance what objections the public has to competing products, and whether it really wants a new one. These surveys are actually a new set of signals permitting better communication between business and the general public--letting them talk to each other. Such communication is vital in a complex society like our own. Without it, we would have not only tremendous waste but the industrial anarchy of countless new unwanted products appearing and disappearing.

2. The title below which best expresses the ideas of this passage is:
   A. The poll taker
   B. Business asks questions
   C. Behind the scenes in business
   D. Our complex business world
   E. Averting industrial anarchy

3. The passage states that polls can benefit industry by:
   A. Reducing waste
   B. Establishing fair prices
   C. Strengthening people's faith in business
   D. Saving small businesses
   E. Serving as a new form of advertising

4. Which is not mentioned as an area in which polls have been conducted?

   A. New products
   B. Politics
   C. Public Relations
   D. Labor-management relationships
   E. Family relationships

Semantic Inquiry

In a normal classroom session, the reading teacher would ask the student to answer the questions which follow each paragraph. The next step would be to check (verify) the student's answer(s). In the first passage (P_1), the answer is (B); in the second passage (P_2), the answers are: 2 (B), 3 (A), and 4 (E).

Even if all students - or the majority - did successfully complete the comprehension tasks, the next step which we are advocating is to have the students verify (justify) their answer in some "logical" manner.[4] It is this type of overt verbal response which we can use to arrive at the constructs of synonymy and entailment. Let us look at the passages to see how these processes work. We will treat each topic separately.

We said above that the principle of synonymy states that certain words/sentences are (almost) equivalent. For example, to arrive at the correct answer (i.e., 1 (B), the student must have realized that the expression"... to go into business for himself" must have had some synonymous relationship to "running one's business." At the same time, he/she must have been able to determine the main idea and the supporting detail as further evidence for choosing 1 (B).

Another type of evidence which we can present to illustrate synonymy (i.e., sentential synonymy)[5] may be illustrated as follows:

4 The term logical is used here to assertain a sequence of thought processes which involve language and thought (i.e., psycholinguistic)

5 In other words, there are other ways of interpreting the same sentence or words as the case may be (e.g., I was struck by the fence, It is too hot to eat, Take your pick, etc.)

... without limitation of hours....

... works harder ... forget the eight-hour day, the forty-hour week...

... the owner uses Sunday to catch up...

If we look at P_2, we also find certain synonymous relationships:

1. poll takers is synonymous to surveys
2. communication is synonymous to talking to each other
3. public relations is synonymous to how the public feels

The student must have used or observed the principle of synonymy in arriving at 4 (C) since this response is synonymou. "o public receptivity unmindful of whether or no such receptivity is positive or negative. In 4 (D), the students must also have realized a synonymous relationship between strike and labor management relations.

We do not know for sure whether a student's response to question 4 of P_2 is simply a matter of his/her not seeing the answer in print and thus gives (E) which is the correct answer. Thus, in order to minimize the degree of guessing or uncertainty, this type of activity regarding syronymous, could be conducted by the teacher. The teacher could have asked, for instance, "Where is labor-management relations mentioned in the passage?" If the student then included some aspect of a strike in his answer, then we are better informed about the student's rationale for that answer.

Thus far, the hypothesis has that the process of synonymy must be at work in the student's mind if he/she is to obtain the correct answer within some logical framework. This does not mean, however, that all students will be able to verbalize (explain) their answers, or respond with the same degree of speed. Rather, it means that the teacher can infer that the student has some logical basis for comprehension.[6]

The second semantic concept mentioned in this study is entailment. We said before (p.1) that this concept states that where two assertions are present, an

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6 This format is also based on procedural methodology in psychological testing and measurement

argument in one assertion incorporates an argument in the second.[7]

Let us turn to the passage(s) provided to see how this semantic tool operates. In the second passage P_2, the answer to question 2 is (B) (i.e., Business asks questions). Again, the teacher's task is to determine the thought processes underlying a student's response.

For the student to have selected (B) for question 2 of the second paragraph, he/she must have used the principle of entailment. In other words, the student must have reasoned as follows: Business asks questions entails banks, drug stores, clothing stores, ask questions. Put another way, it is safe to say that all banks, drug stores, clothing stores are various types of business establishments; however, not all businesses are banks, drug stores, clothing stores, and so on.

Another example of entailment found in the passage (i.e., P_2) pertains to the three types of surveys mentioned. They are the following: (a) political, (b) commercial, and (c) public. These three types of surveys are part of the broad topic of conducting surveys. To point out the concept of entailment, based on the passage, it is safe to conclude that surveys consists of political, commercial, and public types; however, not all surveys can be categorized as political, commercial, or public ones.

Again, if we look at the second passage (P_2), it is argued that for a student to have selected (B) as the answer, as opposed to (A) or (C) for that matter, he/she must have rationalized the answer within the conceptual tool of entailment. This observation seems plausible when we realize that a student (sometimes a reader) selects the main idea or topic sentence of a passage as being the first sentence of a paragraph (passage) which he/she reads. It was not surprising then that approximately 70% of the students selected (A) as the answer for (P_2) question 2. When I hesitated to accept (A) for the answer to the above question, the students then selected (B) instead. Why?

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7 An example of this type of argument can be seen in a sentence such as: I bought a Malibu entails I bought a car; however, it is further argued that not all cars are Malibus but all Malibus are cars.

To answer this question, this author believes that the students must have used the semantic tool of entailment to provide a "stronger" answer to the question. In other words, the students must have argued in the following manner: Poll taking is one way by which a business can ask questions about a product. For instance, the business could have used response labels, convened a town-meeting, sent out questionnaires, and so on. Thus, poll taking is only a subset of the larger set: "asking questions." The student, then, must have used this kind of psycholinguistic process in his/her selection of (B) as opposed to (A). If this kind of reasoning appears to be abstract and far-fetched, it is because the workings of language and mind which involve reading activity is a complex phenomenon.

Summary

In this discussion, our aim was to show how the semantic tools (constructs) of synonymy and entailment form part of a reader's cognitive processes in arriving at certain comprehension answers. We took the position that reading is a language-based activity and that theoretical insights gained from an objective study of language (i.e., synonymy and entailment) can facilitate the thought processes which underlie a reader's activity in solving comprehension tasks. Exercises of this type which we are advocating are aimed at developing and testing comprehension skills. Such activities should not be limited to specific reading classes, but should be applicable to reading in the content areas as well.

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